

L8(4.5) Factoring Special Quadratics (Perfect Square Trinomials & Differences of 2 Squares)

1. Perfect Square Trinomial

$$(a) \ a^2 + 2ab + b^2 = (a + b)(a + b)$$

$$= (a + b)^2$$

$$(b) \ a^2 - 2ab + b^2 = (a - b)(a - b)$$

$$= (a - b)^2$$

Note:

- I. Standard methods, such as **alge-tiles** or **decomposition (SPI or MAN)** will also work, but may take longer.
- II. It is critical to check the **2ab** term to make sure you have a perfect square, or verify your final answer by expanding.

Mar 29-11:14 AM

Ex.1 Factor using a pattern (if possible)

$$(a) \ x^2 + 6x + 9$$

$$= (x+3)(x+3)$$

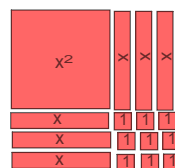
$$= (x+3)^2$$

M:

A:

N:

9
6
3, 3



$$(b) \ 4x^2 - 12x + 9$$

$$= (2x-3)(2x-3)$$

$$= (2x-3)^2$$

M:

A:

N:

36
-12
-6/4, -6/4

$$(c) \ 25x^2 - 30x + 9$$

$$= (5x-3)(5x-3)$$

$$= (5x-3)^2$$

M:

A:

N:

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Ex.1 Factor using a pattern (if possible)

(a) $x^2 + 12x + 36$

$$= (x+6)(x+6)$$

$$= (x+6)^2$$

(b) $x^2 + 13x + 36$

$$= (x+9)(x+4)$$

(c) $4x^2 - 20x + 25$

$$= (2x-5)(2x-5)$$

$$= (2x-5)^2$$

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2. Difference of Squares

$$a^2 - b^2 = (a + b)(a - b)$$

$$= (a - b)(a + b)$$

(the order of the binomials
does not matter)

Examples:

(a) $4x^2 - 9$

$$= (2x-3)(2x+3)$$

$$= 4x^2 + 6x - 6x - 9$$

S:
P:
I:

(b) $9x^2 - 16$

$$= (3x-4)(3x+4)$$

S:
P:
I:

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Ex.2 Factor

(a) $k^2 - 121$

$$(k-11)(k+11)$$

~~$$k^2 - 121$$~~
~~$$(k+11)(k+11)$$~~
~~$$(k-11)(k-11)$$~~

(b) $81m^2 - 144$

$$(9m+12)(9m-12)$$

$$3(3m+4) \cdot 3(3m-4)$$

$$9(3m+4)(3m-4)$$

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Ex.3 Factor using a special pattern:

(a) $25d^2 - 144$

$$= (5d-12)(5d+12)$$

(b) $16x^2 + 24xy + 9y^2$

$$= (4x+3y)(4x+3y)$$

$$= (4x+3y)^2$$

(c) $18p^2q - 60pq + 50q$

$$= 2q(9p^2 - 30p + 25)$$

$$= 2q(3p-5)(3p-5)$$

$$= 2q(3p-5)^2$$

(d) $98a^2 - 32b^2$

$$= 2(49a^2 - 16b^2)$$

$$= 2(7a+4b)(7a-4b)$$

Mar 26-8:24 AM

Ex.4: Factor $x^2 - 10x + 25 - w^2$

$$\begin{aligned} &= (x-5)(x-5) - w^2 \\ &= (x-5)^2 - w^2 \quad \text{let } (x-5)=z \\ &= z^2 - w^2 \\ &= (z+w)(z-w) \\ &= (x-5+w)(x-5-w) \checkmark \end{aligned}$$

Nov 5-8:34 AM

Assigned Work:

p. 230-231 # 3bc, 5, 6, 7, 10, 11, 14

Mar 26-9:06 AM